

Remarks

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Substance of Interview

Applicants' attorney expresses his appreciation for the courtesy of a personal interview granted to him by Examiner McCulley and Mr. Eashoo on December 23, 2008, the results of which are summarized in the Interview Summary form mailed December 30, 2008.

During the interview, Applicants' attorney expressed that perhaps the Examiner made an error in the first paragraph on page 3 of the Office Action, wherein she refers to formula 2-11 at page 8, line 25 of the Joliffe et al. reference (GB '240) as having a 1,4-cyclohexenylene ring for the B ring in formula III on page 6 of the reference. "Cyc" in formula 2-11 is defined as 1,4-cyclohexylene (rather than 1,4-cyclohexenylene) at page 7, lines 25-26 of the reference. A second error is that the second paragraph on page 3 of the Office Action indicates that both Joliffe et al. and Bezborodov et al. are concerned with liquid crystal polymers. Although Joliffe et al. is concerned with liquid crystal polymers, the Bezborodov et al. reference does not appear to disclose liquid crystal **polymers**. Applicants' attorney expressed that the significance of this is that it tends to weaken the Examiner's argument that it would be obvious to combine these two references. The Examiner and Mr. Eashoo indicated that the references would be reconsidered in light of this.

Accordingly, Applicant' attorney argued that the narrowest generic disclosure of the Joliffe et al. reference which encompasses the presently claimed compounds is formula III on page 6 of this reference (since the compounds of the present invention are not encompassed by formula 2-11 for the reason set forth above); and he argued that this generic disclosure was so broad as to fail to suggest the subgenus of compounds of claim 1 of the present application. This is particularly true considering the definitions for the variables as defined on page 5 of the reference, and the fact that any of rings A, B and C could be a 1,4-cyclohexenylene ring, whereas in the compounds of claim 1 of the present application it is the middle ring (A⁴, corresponding to

the B ring of the Joliffe et al. compounds) which must be a 1,4-cyclohexenylene ring. This type of argument is based on MPEP 2144.08, indicating that the fact that a claimed subgenus is encompassed by a prior art genus is not sufficient by itself to establish a presumption of obviousness. Applicants' attorney therefore argued that even if the Bezborodov et al. reference was combined with Joliffe et al., the result of such combination would still be a genus which is so broad as to fail to suggest the subgenus of claim 1 of the present application. The Examiner and Mr. Eashoo indicated that these arguments would be considered after the response is filed.

Applicants' attorney also called attention to the comparison between Examples 5 and 11 in the present application, as will be discussed below. Mr. Eashoo indicated that he would expect that the compound of Example 1 (which is used in Example 5) would have a lower melting point than the compound of Example 9 (used in Example 11), because of the methyl group on the compound of Example 1. Mr. Eashoo therefore suggested that a more meaningful comparison would be between a cured product (Example 5) of the epoxy compound of Example 1 and a cured product of the corresponding epoxy compound which has the 1,4-cyclohexylene ring in place of the 1,4-cyclohexenylene ring. Mr. Eashoo also raised the issue of whether or not such a comparison would be commensurate in scope with the present claims.

Amendments

The claims have been amended, to change "Ar⁴" to --A⁴--, in response to the objection to the claims in the first paragraph on page 2 of the Office Action, as a result of which this objection has been rendered moot.

Claim 3 has been amended to depend on claim 1, in response to the rejection of claims 3 and 10 under the second paragraph of 35 U.S.C. §112, as a result of which this rejection has been rendered moot.

Applicants respectfully submit that these amendments should be entered, even though they are being presented after a final rejection, since the effect of the amendments is merely to address formal matters, not at issue with respect to any of the prior art rejections. Therefore,

entry of these amendments will not necessitate any further consideration and/or search by the Examiner.

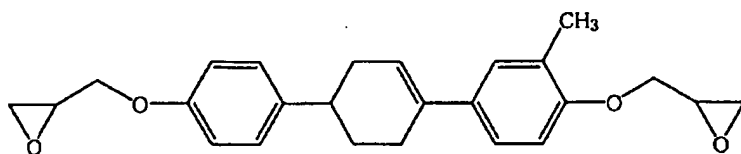
Rejections

The patentability of the presently claimed invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks

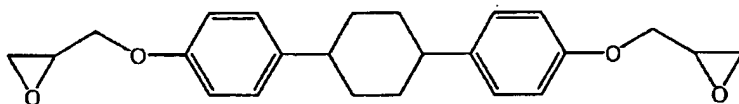
Thus, the rejection of claims 1, 3, 5, 7 and 10 under 35 U.S.C. §103(a) as being unpatentable over Joliff et al. (GB '240) in view of Bezborodov et al. (Liquid Crystals) is respectfully traversed.

Referring to the comments set forth above under "Substance of Interview", Applicants' attorney takes the position that the narrowest generic disclosure of the Joliff et al. reference which encompasses the presently claimed compounds is formula III on page 6 of this reference (since the compounds of the present invention are not encompassed by formula 2-11). This generic disclosure is so broad as to fail to suggest the subgenus of compounds of claim 1 of the present application, particularly considering the definitions for the variables as defined on page 5 of the reference, and the fact that any of rings A, B and C could be a 1,4-cyclohexenylene ring, whereas in the compounds of claim 1 of the present application it is the middle ring (A⁴, corresponding to the B ring of the Joliff et al. compounds) which must be a 1,4-cyclohexenylene ring. In this regard, attention is again directed to MPEP 2144.08, indicating that the fact that a claimed subgenus is encompassed by a prior art genus is not sufficient by itself to establish a presumption of obviousness. Therefore, even if the Bezborodov et al. reference was combined with Joliff et al., the result of such combination would still be a genus which is so broad as to fail to suggest the subgenus of claim 1 of the present application. The Examiner and Mr. Eashoo indicated that these arguments would be considered after the response is filed.

In addition, Example 5 of the present application discloses a cured product of the following epoxy compound (mp. 117°C) having a thermal conductivity of 0.45 W/m•K:



On the other hand, Example 11 discloses a cured product of the following epoxy compound (mp. 154°C):



The epoxy compound of Example 11 has the structure disclosed in the Joliffe et al. reference. [This is the compound at page 8, line 25 of Joliffe et al., specifically referred to by the Examiner in the Office Action.] That is, it has a 1,4-cyclohexylene ring (having no double bond) instead of a 1,4-cyclohexenylene ring (having a double bond) of the epoxy compound of Example 5 and no methyl group on the benzene ring. The thermal conductivity of the cured product of Example 11 is 0.40 W/m•K, which is lower than that of Example 5.

Such a lower melting point and higher thermal conductivity owing to the structural characteristics are not taught or suggested by the references relied upon by the Examiner. Attention is directed to the paragraph bridging pages 4 and 5 of the specification for the benefits of this lower melting point and higher thermal conductivity. As noted therein, in view of the lower melting point, the epoxy compound can be melt-blended with a curing agent at or below the curing temperature; and the higher thermal conductivity makes the epoxy compound useful as an insulating material which requires a high heat dissipation capacity, such as for a printed wiring board.

As noted above, during the interview, Mr. Eashoo indicated that he would expect that the compound of Example 1 (which is used in Example 5) would have a lower melting point than the compound of Example 9 (used in Example 11), because of the methyl group on the compound of

Example 1. However, this lower melting point is due to not only the methyl substituent on the phenyl ring, but also the double bond of the 1,4-cyclohexenylene ring. Thus, melt-kneading with a curing agent at a lower temperature, such as lower than the curing temperature, can be readily carried out by using the epoxy compound having the lower melting point to facilitate the production of a cured product exhibiting liquid crystallinity. Further, it is considered that thermal conductivity of the cured product depends on the double bond of the 1,4-cyclohexenylene ring **rather than the methyl substituent on the phenyl ring**, because the methyl substituent itself has less reactivity. Thus, higher thermal conductivity can be achieved by using the epoxy compound of Example 5.

Also during the interview, Mr. Eashoo raised the issue of whether or not the comparison between Examples 5 and 11 of the present application would be commensurate in scope with the present claims. Applicants respectfully submit that the scope of the present claims is close to Example 5, i.e. Example 5 is representative of the entire claimed scope, and that the comparison of Examples 5 and 11 can be reasonably extended to the entire scope of the claims.

In view of these considerations, Applicants respectfully submit that the presently claimed invention is patentable over the Joliffe et al. and Bezborodov et al. references.

The rejection of claim 4 under 35 U.S.C. §103(a) as being unpatentable over Joliffe et al. in view of Bezborodov et al., further in view of Mormann et al. (US '727), is respectfully traversed.

Applicants take the position that since the epoxy compound itself (claim 1) is patentable over Joliffe et al. in view of Bezborodov et al. for the reasons set forth above, the method for producing this compound (claim 4) is also patentable over these references in view of Mormann et al. See MPEP 2116.01.

The rejection of claims 6 and 11 under 35 U.S.C. §103(a) as being unpatentable over Joliffe et al. in view of Bezborodov et al. and in view of Schoenfeld et al. (US '379), as well as the rejection of claim 8 under 35 U.S.C. §103(a) as being unpatentable over Joliffe et al. in view of Bezborodov et al., further in view of McCormack et al. (US '555) and the rejection of claim 12 under 35 U.S.C. §103(a) as being unpatentable over Joliffe et al. in view of Bezborodov et al.

and in view of Schoenfeld et al., further in view of McCormack et al., are all respectfully traversed.

All of these claims are indirectly dependent on claim 1, which is patentable over Joliffe et al. in view of Bezborodov et al. for the reasons set forth above. Therefore, even if the additional references are combined with Joliffe et al. and Bezborodov et al. in the manner suggested by the Examiner, the result of such combination would still not suggest the subject matter of claims 6, 8, 11 and 12.

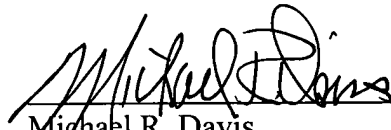
For these reasons, Applicants take the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of objection and rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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